registered professional engineer to ensure construction according to the approved design. On completion of construction, the structure shall be certified by a registered professional engineer experienced in the field of dam construction as having been constructed in accordance with accepted professional practice and the approved design.

(ix) A permanent identification marker, at least 6 feet high that shows the dam number assigned pursuant to §77.216–1 of this title and the name of the person operating or controlling the dam, shall be located on or immediately adjacent to each dam within 30 days of certification of design pursuant to this section.

(4) All dams, including those not meeting the size or other criteria of §77.216 (a) of this title, shall be routinely inspected by a registered professional engineer, or someone under the supervision of a registered professional engineer, in accordance with Mining Enforcement and Safety Administration regulations pursuant to §77.216–3 of this title.

(5) All dams shall be routinely maintained. Vegetative growth shall be cut where necessary to facilitate inspection and repairs. Ditches and spillways shall be cleaned. Any combustible materials present on the surface, other than that used for surface stability such as mulch or dry vegetation, shall be removed and any other appropriate maintenance procedures followed.

(6) All dams subject to this section shall be certified annually as having been constructed and modified in accordance with current prudent engineering practices to minimize the possibility of failures, Any changes in the geometry of the impounding structure shall be highlighted and included in the annual certification report. These certifications shall include a report on existing and required monitoring procedures and instrumentation, the average and maximum depths and elevations of any impounded waters over the past year, existing storage capacity of impounding structures, any fires occurring in the material over the past year and any other aspects of the structures affecting their stability.

(7) Any enlargements, reductions in size, reconstruction or other modification of the dams shall be approved by the regulatory authority before construction begins.

(8) All dams shall be removed and the disturbed areas regraded, revegetated, and stabilized before the release of bond unless the regulatory authority approves retention of such dams as being compatible with an approved postmining land use (§715.13).

§715.19 Use of explosives.

(a) *General.* (1) The permittee shall comply with all applicable local, State, and Federal laws and regulations and the requirements of this section in the storage, handling, preparation, and use of explosives.

(2) Blasting operations that use more than the equivalent of 5 pounds of TNT shall be conducted according to a time schedule approved by the regulatory authority.

(3) All blasting operations shall be conducted by experienced, trained, and competent persons who understand the hazards involved. Persons working with explosive materials shall—

(i) Have demonstrated a knowledge of, and a willingness to comply with, safety and security requirements;

(ii) Be capable of using mature judgment in all situations;

(iii) Be in good physical condition and not addicted to intoxicants, narcotics, or other similar types of drugs;

(iv) Possess current knowledge of the local, State and Federal laws and regulations applicable to his work; and

(v) Have obtained a certificate of completion of training and qualification as required by State law or the regulatory authority.

(b) *Preblasting survey.* (1) On the request to the regulatory authority of a resident or owner of a manmade dwelling or structure that is located within one-half mile of any part of the permit area, the permittee shall conduct a preblasting survey of the dwelling or structure and submit a report of the survey to the regulatory authority.

(2) Personnel approved by the regulatory authority shall conduct the survey to determine the condition of the dwelling or structure and to document any preblasting damage and other

physical factors that could reasonably be affected by the blasting. Assessments of structures such as pipes, cables, transmission lines, and wells and other water systems shall be limited to surface condition and other readily available data. Special attention shall be given to the preblasting condition of wells and other water systems used for human, animal, or agricultural purposes and to the quantity and quality of the water.

(3) A written report of the survey shall be prepared and signed by the person or persons who conducted the survey and prepared the written report. The report shall include recommendations of any special conditions or proposed adjustments to the blasting procedures outlined in paragraph (e) of this section which should be incorporated into the blasting plan to prevent damage. Copies of the report shall be provided to the person requesting the survey and to the regulatory authority.

(c) *Public notice of blasting schedule.* At least 10 days, but not more than 20 days before beginning a blasting program in which explosives that use more than the equivalent of 5 pounds of TNT are detonated, the permittee shall publish a blasting schedule in a newspaper of general circulation in the locality of the proposed site. Copies of the schedule shall be distributed by mail to local governments and public utilities and to each residence within one-half mile of the blasting sites described in the schedule. The permittee shall republish and redistribute the schedule by mail at least every 3 months. Blasting schedules shall not be so general as to cover all working hours but shall identify as accurately as possible the location of the blasting sites and the time periods when blasting will occur. The blasting schedule shall contain at a minimum—

(1) Identification of the specific areas in which blasting will take place. The specific blasting areas described shall not be larger than 300 acres with a generally contiguous border;

(2) Dates and times when explosives are to be detonated expressed in not more than 4-hour increments;

(3) Methods to be used to control access to the blasting area;

(4) Types of audible warnings and all-clear signals to be used before and after blasting; and

(5) A description of possible emergency situations (defined in paragraph (e)(1)(ii) of this section), which have been approved by the regulatory authority, when it may be necessary to blast at times other than those described in the schedule.

(d) *Public notice of changes to blasting schedules.* Before blasting in areas not covered by a previous schedule or whenever the proposed frequency of individual detonations are materially changed, the permittee shall prepare a revised blasting schedule in accordance with the procedures in paragraph (c) of this section. If the change involves only a temporary adjustment of the frequency of blasts, the permittee may use alternate methods to notify the governmental bodies and individuals to whom the original schedule was sent.

(e) *Blasting procedures*—(1) *General.* (i) All blasting shall be conducted only during the daytime hours, defined as sunrise until sunset. Based on public requests or other considerations, including the proximity to residential areas, the regulatory authority may specify more restrictive time periods.

(ii) Blasting may not be conducted at times different from those announced in the blasting schedule except in emergency situations where rain, lightning, other atmospheric conditions, or operator or public safety requires unscheduled detonation.

(iii) Warning and all-clear signals of different character that are audible within a range of one-half mile from the point of the blast shall be given. All persons within the permit area shall be notified of the meaning of the signals through appropriate instructions and signs posted as required by § 715.12.

(iv) Access to the blasting area shall be regulated to protect the public and livestock from the effects of blasting. Access to the blasting area shall be controlled to prevent unauthorized entry at least 10 minutes before each blast and until the permittee's authorized representative has determined that no unusual circumstances such as imminent slides or undetonated charges exist and access to and travel

in or through the area can safely resume.

(v) Areas in which charged holes are awaiting firing shall be guarded, barricaded and posted, or flagged against unauthorized entry.

(vi) Airblast shall be controlled such that it does not exceed 128 decibel linear-peak at any manmade dwelling or structure located within one-half mile of the permit area.

(vii) Except where lesser distances are approved by the regulatory authority (based upon a preblasting survey or other appropriate investigations) blasting shall not be conducted within—

(A) 1,000 feet of any building used as a dwelling, school, church, hospital, or nursing facility;

(B) 500 feet of facilities including, but not limited to, disposal wells, petroleum or gas-storage facilities, municipal water-storage facilities, fluid-transmission pipelines, gas or oil-collection lines, or water and sewage lines; and

(C) 500 feet of an underground mine not totally abandoned except with the concurrence of the Mining Enforcement and Safety Administration.

(2) *Blasting standards.* (i) Blasting shall be conducted to prevent injury to persons, damage to public or private property outside the permit area, adverse impacts on any underground mine, and change in the course, channel, or availability of ground or surface waters outside the permit area.

(ii) *Ground vibration*—(A) *General.* In all blasting operations, except as otherwise authorized in paragraph (e)(2)(iii) of this section, the maximum ground vibration shall not exceed a value approved by the regulatory authority. It shall be established in accordance with the maximum peak-particle-velocity limit of paragraph (e)(2)(ii)(B), the scaled-distance equation of paragraph (e)(2)(ii)(C), or the blasting-level chart of paragraph (e)(2)(ii)(D), or such other standard established under paragraph (e)(2)(ii)(E), of this section. All structures in the vicinity of the blasting area, not listed in paragraph (e)(2)(ii)(B), of this section, such as water towers, pipelines and other utilities, tunnels, dams, impoundments, and underground mines, shall be protected from damage by establishment of a maximum allowable limit on the ground vibration, submitted by the operator and approved by the regulatory authority before the initiation of blasting.

(B) *Maximum peak-particle velocity.* (*1*) The maximum ground vibration shall not exceed the following limits at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area.

Distance (*D*) from blasting site, in feet	Maximum allowable peak particle velocity (*V* max) for ground vibration, in inches/second [1]	Scaled-distance factor to be applied without seismic monitoring [2]
0 to 300	1.25	50
301 to 5,000	1.00	55
5,001 and beyond	0.75	65

[1] Ground vibration shall be measured as particle velocity. Particle velocity shall be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three measurements.

[2] Applicable to the scaled-distance equation of paragraph (e)(2)(ii)(C)(*1*) of this section.

(*2*) A seismographic record shall be provided for each blast.

(C) *Scaled-distance equation.* (*1*) The operator may use the scaled-distance equation, $W=(D/Ds)^2$, to determine the allowable charge weight of explosives to be detonated in any 8-millisecond period without seismic monitoring; where W=the maximum weight of explosives, in pounds; D=the distance, in feet, from the blasting site to the nearest protected structure; and Ds=the scaled-distance factor, which may initially be approved by the regulatory authority using the values for scaled-distance factor listed in paragraph (e)(2)(ii)(B)(*1*), of this section.

(*2*) The development of a modified scaled-distance factor may be authorized by the regulatory authority on receipt of a written request by the operator, supported by seismographic records of blasting at the minesite. The modified scaled-distance factor shall be determined such that the particle velocity of the predicted ground vibration will not exceed the prescribed maximum allowable peak particle velocity of paragraph (e)(2)(B)(*1*) of this section at a 95-percent confidence level.

(D) *Blasting-level chart.* (*1*) An operator may use the ground-vibration limits in Figure 1 to determine the maximum allowable ground vibration.

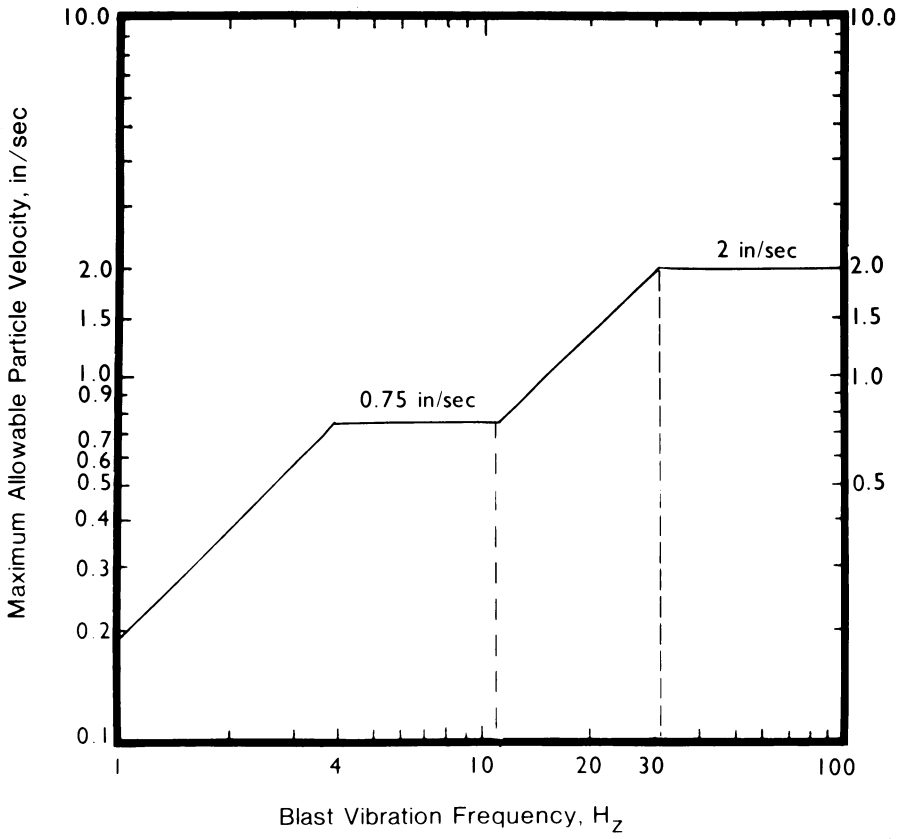

Figure 1. Alternative blasting level criteria.

(Source Modified from figure B-1, Bureau of Mines RI 8507)

(*2*) If the Figure 1 limits are used, a seismographic record including both particle-velocity and vibration-frequency levels shall be provided for each blast. The method for the analysis of the predominant frequency contained in the blasting records shall be approved by the regulatory authority before application of this alternative blasting criterion.

(E) The maximum allowable ground vibration shall be reduced by the regulatory authority beyond the limits otherwise provided by this section, if determined necessary to provide damage protection.

(F) The regulatory authority may require an operator to conduct seismic monitoring of any or all blasts and may specify the location at which the measurements are taken and the degree of detail necessary in the measurement.

(iii) If blasting is conducted in accordance with paragraph (e)(2)(i) of this section, the maximum ground-vibration and airblast standards shall not apply at the following locations:

(A) At structures owned by the permittee and not leased to another person.

(B) At structures owned by the permittee and leased to another person, if a written waiver by the lessee is submitted to the regulatory authority before blasting.

(3) *Records of blasting operations.* A record of each blast, including seismograph reports, shall be retained for at least 3 years and shall be available for inspection by the regulatory authority and the public on request. The record shall contain the following data—

(i) Name of permittee, operator, or other person conducting the blast;

(ii) Location, date, and time of blast;

(iii) Name, signature, and license number of blaster-in-charge;

(iv) Direction and distance, in feet, to nearest dwelling, school, church, or commercial or institutional building neither owned or leased by the permittee;

(v) Weather conditions;

(vi) Type of material blasted;

(vii) Number of holes, burden, and spacing;

(viii) Diameter and depth of holes;

(ix) Types of explosives used;

(x) Total weight of explosives used;

(xi) Maximum weight of explosives detonated within any 8 millisecond period;

(xii) Maximum number of holes detonated within any 8 millisecond period;

(xiii) Methods of firing and type of circuit;

(xiv) Type and length of stemming;

(xv) If mats or other protections were used;

(xvi) Type of delay detonator used, and delay periods used;

(xvii) Seismograph records, where required, including—

(A) Seismograph reading, including exact location of seismograph and its distance from the blast;

(B) Name of person taking the seismograph reading; and

(C) Name of person and firm analyzing the seismograph record.

[42 FR 62680, Dec. 13, 1977; 43 FR 2722, Jan. 19, 1978, as amended at 48 FR 9805, Mar. 8, 1983]

§ 715.20 Revegetation.

(a) *General.* (1) The permittee shall establish on all land that has been disturbed, a diverse, effective, and permanent vegetative cover of species native to the area of disturbed land or species that will support the planned postmining uses of the land approved according to §715.13. For areas designated as prime farmland, the reclamation procedures of §716.7 shall apply.

(2) Revegetation shall be carried out in a manner that encourages a prompt vegetative cover and recovery of productivity levels compatible with approved land uses. The vegetative cover shall be capable of stabilizing the soil surface with respect to erosion. All disturbed lands, except water areas and surface areas of roads that are approved as a part of the postmining land use, shall be seeded or planted to achieve a vegetative cover of the same seasonal variety native to the area of disturbed land. If both the pre- and postmining land use is intensive agriculture, planting of the crops normally grown will meet the requirement. Vegetative cover will be considered of the same seasonal variety when it consists of a mixture of species of equal or superior utility for the intended land use when compared with the utility of naturally occurring vegetation during each season of the year.

(3) On Federal lands, the surface management agency shall be consulted for approval prior to revegetation regarding what species are selected, and following revegetation, to determine when the area is ready to be used.

(b) *Use of introduced species.* Introduced species may be substituted for native species only if appropriate field trials have demonstrated that the introduced species are of equal or superior utility for the approved postmining land use, or are necessary to achieve a quick, temporary, and stabilizing cover. Such species substitution shall be approved by the regulatory authority. Introduced species shall meet applicable State and Federal seed or introduced species statutes, and shall not include poisonous or potentially toxic species.

(c) *Timing of revegetation.* Seeding and planting of disturbed areas shall be